

Honeybees: To overwinter or not

Final Report for FNE08-626

Project Type: Farmer

Funds awarded in 2008: \$7,500.00

Projected End Date: 12/31/2009

Region: Northeast

State: Pennsylvania

Project Leader:

[Craig Cella](#)

Craig A. Cella

Project Information

Summary:

2009 Final Report

The purpose of this project was twofold: one to compare the cost of over wintered colonies against package bees and to compare shook swarmed hives to traditional beehive management for mite control. Both groups did poorly with the package bees losing less money per hive than the over wintered ones. I've always been told that package bees don't have a problem with mites the first year. This was not the case with my bees and I must change my practices (along with a lot of other people) or we will not be able to provide the bees needed for pollination and honey production.

It was very disappointing that these results have not helped fellow beekeepers at all. The over wintered colonies did terrible the first year and the package bees were in the same boat. The bright side is that I know that a beekeeper must treat - either with some kind of material or by hive manipulation (breaking brood cycle or IPM). If you do not treat in some way they will die. It is that simple.

Introduction:

Project profile and participants

I grew up on a small farm in New Jersey and purchased my first bees in September 1957 with money I earned shoveling snow the previous winter. Since that time, I have always had honeybees and after serving in the United States Army, I moved them to Pennsylvania with me. Over the years, I have cared for well over two thousand colonies, attended numerous meetings and several seminars, and I worked with some of the most respected people in the field. I have also had the opportunity to serve as a honeybee inspector with the Pennsylvania Department of Agriculture and apiarist for Penn State University for several years. These experiences have given me a good knowledge in both the classroom and the bee yard.

I know that through studying and research that I have done in other areas of agriculture and three previous SARE grants how important it is to have independent

research done in order to improve production and thus make beekeeping more sustainable. Ideas are only dreams until they are put into a research project with both a control and test group.

Participants:

This was primarily a one person research project however Maryann Frazier, Penn State University Bee Extension Specialist, Glenn Crimbring, PA Dept. of Agriculture Honeybee Inspector Dennis Van Engelsdorp, PA Dept. of Agriculture State Apiarist Provided input and help throughout the study. Also, Trevor Stauffer, a high school student maintained one of the bee yards outside of Milesburg, PA

Project Objectives:

The first year's study was to determine if it was more profitable to over winter honeybees or to purchase new packages each spring. The second year was to be a study on shake swarming the colony (shaking all the bees out of the old hive and placing them into new equipment) to see if mites could be controlled without the use of chemicals.

Cooperators

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Research

Materials and methods:

We went into the fall 2007 with 50 strong hives in 4 different locations. All were treated with Mite Away II September 20, 2007 and by April 20, 2008 only 21 were still alive. New queens were introduced the first week of April. Divides were made where possible. One hundred packages were installed on April 1, 2008 on new equipment or on power washed frames and foundations as per Penn State's directions. A decision was made to go from the original 50 over wintered and 50 packages to 100 packages because of the large over winter losses. This also allowed me to do a little testing in July and August using a protein supplement on 40 hives with help from PA Dept. of Ag. And Penn State University. Also, some colonies were "shook swarmed" during the first week in September 2008 which is a procedure where all the bees and queen are removed from their hive and placed on a new foundation. This forces them to build new honeycomb and breaks the brood cycle which in turn breaks the mite cycle. Some of these colonies also were requeened at the same time. All surviving colonies were evaluated on April 1, 2009.

Research results and discussion:

Results, Conditions and Economics

Chronology:

To start with we had a heavy winter loss (by April 2008, 29 out of 50) which isn't really that bad in today's world. 50% is about normal with some years higher and some lower. Both the over wintered colonies and the packaged colonies were doing well in late April, May and into June but then things stood still in July and, by August, they were on a downhill slide that continued through September and into October 2008. I expected to see more of a mite loss on the shook swarmed hives than I did and I did not expect to see colonies dwindle away in late summer. By October 21, 2008 I was down to 68 colonies out of 125 in April 2008. I could have had more but when I knew a colony could not make it I would dispose of it. I have learned it does not pay to feed a problem because the end result will be the same. The 72 sticky board drop of Varroa mites on September 3, 2008 was reduced 71% by October 1 on the shook swarmed hives. I was expecting 80% or more.

The final result for the second winter (2008-2009) was only 21 colonies alive on April 1, 2009 out of the 68 that looked good on October 21, 2008. They did not die from starvation - I fed all the syrup they would take in September and October. It was the same old story: January they look okay; February they did not look any better and some had gone backwards; then along comes March and they crash. Of those 21 colonies still alive, only 6 would be considered fair, the rest are dead and just don't know it.

They will not amount to anything this summer if they even survive until the end of April 2009.

It did not make any difference by April 1 whether the hive was shook swarmed, had a new queen in September or it was just left alone and managed in the traditional beekeeping way. I was very disappointed to put it mildly that I didn't have something to make all the money and time invested worthwhile. However, now I have eliminated more possibilities from the equation and I only have one option left and that is to treat for mites one way or another.

Treatment details:

All of the 21 colonies that were alive on April 20, 2008 were requeened on April 20. This is a recommended practice to help reduce swarming and to increase brood production producing more adult bees for the main honey flow. Ten of the colonies were strong enough to divide on April 20, 2008. I used a double screen, which is two pieces of #8 hardware cloth separated by a half inch spacer with a wood frame much like a queen excluder. This allows the heat from the original hive on the bottom to go up into the super with the queen but keeps the bees from passing pheromones from one colony to the other thus they feel queenless and will usually accept a new queen. It is given its own upper entrance on the opposite side from the parent hive. Of the 10 queens introduced, nine were accepted and developed into normal colonies. This gave me a total of 130 colonies on May 1, 2008.

Most of the colonies, both the ones started from packages and over wintered, (along with their divides) looked pretty good by late May and I expected a good summer. The locust bloomed in late May and they were able to make a small surplus off the bloom. Things looked good and with 30 acres of sweet clover and 8 acres of buckwheat yet to bloom on our farm, I was in high hopes. The other locations were equal or better as far as nectar plants went so it looked like a good year ahead. WE kept 30 hives at home, moved 20 east about 25 miles to Montour Preserve (an electric power company park) 20 west about 30 miles to a state park, 20 to the top

of a mountain 40 miles away and 20 to Lock Haven area. We also had 20 about 3 miles east of our home in an abandoned stone quarry. This gave the bees a very diverse foraging area - from river bottom land to high mountain plateau.

June brought the clovers into bloom and the bees seemed to be doing well in the beginning. However by the end of the month, many of the hives did not seem to be storing the nectar they should or have the adult population I expected to see. They were at a standstill or going backwards. It is a difficult thing to notice until it is a more advanced problem. By the end of August 2008, it was very easy to see and to explain to people. On August 25, when we evaluated the protein supplement study, it was very obvious we had a big problem. The four of us all agreed the bees did not look good and it was just the beginning of the downhill slide.

On September 5, 2008, we shook swarmed all 20 of the hives at the quarry 3 miles east of our house. This is a process where you move the old hive off its stand and place a new hive with new frames and foundation in its place. Next, you take each frame, one at a time, and shake all the bees off into the new equipment. Then you give them lots of sugar syrup - all they will take - until they have all the frames drawn out.

I fed one colony for a university study 58 gallons of syrup in a 6 week period. The queen will go into a shut down for a week to 10 days while the workers are building comb and storing food. This will give you perfect, beautiful new comb and I had hoped for, at least, an 80% reduction in mites. Eighty percent of the mites are buried in the brood so, when the old comb is removed, you eliminate those mites. Well, it helped but I did not get the 80% kill I wanted. Now, I look back and feel I should have treated with Oxalic acid, which is a natural chemical found in our own bodies. They have been using it for several years in Europe and Canada during the broodless period - winter - with excellent results. Hopefully, it will soon be approved in this country. Ten of these hives were requeened with new queens at the same time as I shook swarmed them. The old brood and frames were destroyed to prevent reinfection of the other hives.

One half of the other hives were also requeened the first week in September 2008 and feeding was started. All hives received 1 gallon with Fumagillin mixed in the syrup. Most of the feeding was done using the water fountains that are used by growers of bob white quail inside the hive. This gives me better control of which hives receive syrup and which ones don't and it helps to prevent robbing. By the end of goldenrod bloom, I started moving hives to one central location to save time and fuel. This was when I first decided some of the hives wouldn't make it through the winter and on October 1, 2008; I started to combine as they continued to slide backwards until on October 30th, I only had 68 good hives left. I lost 7 more by the end of December and then came January 2009. Some looked fair but by observation they were still sliding and by late February 2009 I was down to 37. Some hives were so weak I would put 3 or 4 together to make one. One April 1, 2009, the final count was 21 alive and only 6 were strong enough to be considered fair. Only 5 of the shook swarmed hives survived the winter and 3 are weak but should live. Thirteen of those still alive had been requeened in September 2008 and 4 of those were in the fair condition group. The cost of replacement queens in September could not be justified by the results this spring. The bottom line is I must do something different this year.

Conditions:

Overall, I felt it was a good year for bees. The weather for our locust bloom was excellent and the summer had a lot of nice, sunny days and continued through the goldenrod bloom. However, it takes three ingredients to produce a honey crop: good weather, good nectar flow and good bees. I didn't have the good bees. They started

out doing well but by mid-June they came to a stand still and by late July and August it was apparent they had problems.

When we evaluated the results of the protein supplement experiment on August 25, 2008, Maryann commented after the last hive was inspected she just couldn't understand it. When we would judge a hive it would seem to have more sealed brood in proportion to the adult bees than normal. Where were the adult bees? Were viruses shortening their lives? This would account for the small honey crop - each bee just brings in enough food to raise a replacement and then dies prematurely without ever making a surplus for winter. It is just a vicious cycle and only got worse as fall and winter approached. I fed a tremendous amount of sugar syrup to both the shook swarmed and conventional hives in September and October so they would have enough to get through the winter.

This past winter was one of the best I can remember. We had some cold weather which doesn't hurt the bees and very few, cold and damp days. March was excellent with many above freezing days. On March 18, 2009, they were still bringing in pollen at 6:15 pm so, I cannot blame it on the weather.

Economics:

Cost to over winter a hive: \$122

75 lbs of honey@\$1.50 = \$112.50 (value before extracting)

Sugar and fumidil B \$3 X 2 = \$6

Mite Away II \$3.5 = \$3.5

Total cost is \$122 X 50 hives = \$6100

Total honey production from the remaining 21 hives left alive on April 20th:

371 lbs @\$2 per pound = \$742

Or, income of \$14.84 per over wintered hive that started out in the study

A loss of \$97.66 per hive of over wintered bees.

Cost of packaged bees:\$87

Cost of package: \$75

Cost of sugar, 20 lbs@\$50=\$10

Fumidil B= \$2

Total cost per hive: \$87

Income/production was 1040 lbs or 10.4 lbs/hive@\$2/lb=\$20.4

Net loss of \$66.20 per packaged hive

The package hives produced less of a loss (\$31.46 less) per colony but this is still terrible. Of all the beekeepers I inspect for the PA Dept. of Ag, in PA about two thirds are in the same boat.

When you consider I had 68 colonies on October 21, 2007 and only 6 that were in fair condition on April 1, 2009 with an over wintering cost of \$112.50 worth of honey per hive (total of \$7650) I would have been much further ahead to have dumped them all out in September and bought 100 new packages this spring.

Those 6 fair ones are not as strong as a 3 lb package and they still should have a \$20 new queen.

Participation Summary

Education & Outreach Activities and Participation Summary

PARTICIPATION SUMMARY:

Education/outreach description:

I spoke at the Penn State University Beaver Campus this spring and it was the most attended class of the weekend (over 150 people attended my workshop). I am scheduled to speak in Lewisburg, PA (April 2009) and Hershey, PA (May 2009). I was also asked to speak at the annual PA State Beekeepers meeting in November 2009. I am waiting until this winter (2009-2010) to write an article to see how the overwintered colonies and the new packages perform with a timely treatment program. I also will be speaking at several regional meetings and currently mentoring the new State Honey Queen.

Project Outcomes

Assessment of Project Approach and Areas of Further Study:

Future Recommendations

Adoption

Now that April 1, 2009 has come and gone, I have evaluated all the colonies from the different treatment groups and it is very disappointing. I did not make any difference whether they had new queens in the fall or new queens in July. The ones that were shook swarmed did not survive any better than the ones left to overwinter in the normal way. There just wasn't any pattern to it. I really do believe I had a whole lot of sick bees by mid-summer and they could not overcome their problems. NO one has the answers yet on how to correct it. My neighbor just lost 1300 out of 1500 and the other 200 hives are really shaky as to whether they will make it or not.

My only option still left open is to treat for mites with Formic Acid, Apiquard, ApiLife VAR or Oxalic acid: all natural products. I do not want to use the hard chemicals that cause problems with bees. Even the packages start to go backwards after about 3 to 4 months and, again, I feel this is because of a mite buildup which just feeds the virus levels among the bees. They know that deformed wing virus shortens the life of a honeybee by 20% and that could be your honey crop.

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